

New England.—1st to 8th, 12th to 15th, 17th, 22d, 23d, 24th, 26th to 31st.

Middle Atlantic states.—1st to 8th, 11th to 17th, 21st to 24th, 26th to 29th, 31st.

South Atlantic states.—1st to 19th, 21st, 23d to 31st.

Florida peninsula.—1st to 8th, 10th, 11th, 14th to 22d, 24th to 29th, 31st.

Eastern Gulf.—1st to 9th, 12th, 17th, 21st, 22d, 24th to 31st.

Western Gulf.—1st to 11th, 12th, 13th, 16th to 19th, 21st, 22d, 24th to 31st.

Tennessee.—1st to 9th, 11th to 17th, 23d, 24th, 25th, 27th, 28th, 30th, 31st.

Ohio valley.—2d to 9th, 11th to 17th, 20th to 24th, 26th, 28th.

Lower lakes.—2d to 8th, 10th to 17th, 20th to 24th, 27th to 30th.

Upper lakes.—1st to 7th, 10th, 11th, 12th, 14th, 15th, 16th, 19th to 27th, 30th, 31st.

Extreme northwest.—2d, 6th, 10th, 11th, 13th, 14th, 15th, 19th to 23d, 25th, 26th, 30th, 31st.

Upper Mississippi valley.—1st to 17th, 19th to 24th, 26th, 27th, 30th, 31st.

Missouri valley.—1st to 8th, 10th to 30th.

Northern slope.—2d to 6th, 8th to 11th, 13th, 15th, 19th, 21st, 22d, 24th, 25th, 29th, 30th, 31st.

Middle slope.—2d to 15th, 17th to 21st.

Southern slope.—3d, 5th to 9th, 11th to 15th, 20th, 22d, 23d, 25th, 26th, 27th, 31st.

Southern plateau.—1st to 6th, 8th to 12th, 17th to 31st.

Middle plateau.—1st, 3d, 4th, 6th, 9th, 13th, 20th, 21st, 26th, 28th to 31st.

Northern plateau.—10th, 29th.

Pacific coast.—Roseburg, Oregon, 8th, 9th; Fort Klamath, Oregon, 9th; Oakwood, California, 10th; Fort Bidwell, California, 26th.

Instances of damage by lightning during the month of July have been very numerous. The following are some of the more important cases:

Milwaukee, Wisconsin: a man and horse were killed by lightning on the street in this city on the morning of the 4th.

Scranton, Pennsylvania: several objects were struck by lightning at Dickson City, near here, on the night of 5-6th.

Detroit, Michigan: considerable damage was done to the instruments by lightning at the telephone exchange on the 11th.

Underhill, Chittenden county, Vermont: during a heavy thunder storm on the 13th a schoolhouse was struck by lightning, and all of the pupils were more or less injured. The floor of the school room was torn up, and the walls and ceilings were wrecked, and large holes were made in the ground in the school yard. Several trees near by were also struck.

Portland, Maine: several objects in this city and vicinity were struck by lightning and damaged to a more or less extent during the thunder storm of the 13th.

Nashua, New Hampshire: at 5 p. m., of the 13th, a residence in this city was struck by lightning and one person killed. Damage by lightning on this date was done at numerous points in New Hampshire and Vermont.

Latrobe, Westmoreland county, Pennsylvania: a large barn at Pleasant Unity, in this county, was struck by lightning and destroyed on the afternoon of the 13th, causing damage estimated at more than \$4,000.

Cleveland, Ohio: during the thunder storm of the 13th numerous objects in and about the city were struck by lightning, and damaged to a more or less extent.

Anna, Union county, Illinois: a man and team were killed by lightning at this place on the 13th.

Fidelity, Jersey county, Illinois: at about 4 p. m., of the 16th, a dwelling at this place was struck and badly damaged by lightning. Nearly all of the plastering and weather boarding were torn from the west end of the building, the windows were broken, and the chimney was burst from top to bottom.

Carthage, Jasper county, Missouri: a large barn and slaugh-

ter house at this place was struck by lightning and burned on the evening of the 17th. Several barns and other buildings were struck by lightning at Marshall, Saline county, in this state.

Jacksonville, Florida: numerous objects were struck and damaged by lightning during the thunder storm on the 18th.

Sanford, Florida: buildings at this place were injured by lightning on the 1st and 18th.

Wabasha, Wabasha county, Minnesota: during the thunder storm of the night of the 19th a dwelling was struck by lightning and burned.

Grand Haven, Michigan: on the 21st lightning struck the building in which the signal office is located, demolishing a flag-staff and damaging instruments.

Bismarck, Dakota: the building in which the signal office is located was struck by lightning and set on fire on the 23d.

Rich Hill, Bates county, Missouri: during a thunder storm, on the 24th, a man and team were killed by lightning.

Dayton, Washington Territory: the signal office and instruments were damaged by lightning on the 29th.

New London, Connecticut: four barns and two dwellings in the vicinity of this city were struck by lightning on the 29th, the damage caused being estimated at \$3,500.

Leavenworth, Kansas: seven barns in this locality were struck by lightning on the 30th.

ATMOSPHERIC ELECTRICITY INTERRUPTING TELEGRAPHIC CONNECTION.

Fort Macon, North Carolina: 29th.

Fort Stockton, Texas: 24th.

On the summits of Pike's Peak, Colorado, on the 14th and 25th, the atmosphere was highly charged with electricity, which had a peculiar effect upon the instruments.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos have been observed in the various districts on the following dates:

New England.—Provincetown, Massachusetts, 3d; Rowe, Massachusetts, 11th and 27th; Cornish, Maine; Strafford and Woodstock, Vermont, 24th; New Haven, Connecticut, 31st.

Middle Atlantic states.—Cape Henry, Virginia, 8th and 9th.

South Atlantic states.—Augusta, Georgia, 3d; Charleston, South Carolina, and Hatteras, North Carolina, 4th; Jacksonville, Florida, 17th.

Eastern Gulf.—Pensacola, Florida, 3d, 26th, 30th; Vicksburg, Mississippi, 25th.

Western Gulf.—Indianola, Texas, 1st; Lead Hill, Arkansas, 2d, 13th, 17th, 29th; Little Rock, Arkansas, 17th, 19th; Palestine, Texas, 27th.

Tennessee.—Nashville and Murfreesborough, 11th; Memphis, 12th, 19th, 30th.

Ohio valley.—Louisville, Kentucky, 10th; Frankfort, Kentucky, 10th, 20th; Vevay, Indiana, 4th, 28th; Laconia, Indiana, 13th; Griffin station, Indiana, 20th; Westerville, Ohio, 25th.

Lower lakes.—Cleveland, Ohio, 2d, 9th; Oswego, New York, 15th; Toledo, Ohio, 20th.

Upper lakes.—Lansing, Michigan, 2d, 20th, 29th; Swartz Creek, Michigan, 9th, 20th.

Extreme northwest.—Saint Vincent, Minnesota, 19th; Fort Buford, Dakota, 28th.

Upper Mississippi valley.—Cresco, Iowa, 7th; Polo, Illinois, 13th, 25th, 26th; Anna, Illinois, 13th, 29th; Saint Louis, Missouri, 17th; Monticello, Iowa, 20th; Swanwick, Illinois, 29th.

Missouri valley.—Nebraska City, Nebraska, 7th; De Soto, Nebraska, 7th, 21st, 24th, 26th, 31st; Johnson, Nebraska, 12th.

Middle slope.—Pike's Peak, Colorado, 11th; Yates Centre, 13th, 15th, 17th, 19th, 25th.

California.—Sacramento, 11th; San Francisco, 11th.

Utah.—Nephi, 4th.

LUNAR HALOS.

Lunar halos have been observed in the various districts on the following dates:

Middle Atlantic states.—Freehold, New Jersey, 14th; Wytheville, Virginia, 12th, 14th, 17th, 23d; Johnstown, Virginia, 15th; Barnegat City, New Jersey, 17th; Albany, New York, 16th; Delaware Breakwater, Delaware, 17th; Philadelphia, Pennsylvania, 17th, 20th, 21st, 22d; West Washington, District of Columbia, 17th; Woodstock, Maryland, 17th, 19th; Lynchburg, Virginia, 20th.

South Atlantic states.—Hatteras, North Carolina, 4th; Jacksonville, Florida, 20th.

Florida peninsula.—Sanford, 11th, 12th, 13th; Limona, 14th, 15th; Key West, 15th.

Eastern Gulf.—New Orleans, Louisiana, 10th, 11th.

Western Gulf.—Galveston, Texas, 8th to 11th; Lead Hill, Arkansas, 10th; Fort Smith, Arkansas, 16th; Indianola, Texas, 15th to 18th, 20th; Little Rock, Arkansas, 17th, 25th; Point Pleasant, Louisiana, 18th.

Tennessee.—Murfreesborough, 14th; Memphis, 25th.

Ohio valley.—Vevay, Indiana, 10th, 19th, 20th.

Lower lakes.—Buffalo, New York, 16th; North Volney, New York, 21st.

Upper lakes.—Grand Haven, Michigan, 12th, 13th; Port Huron, Michigan, 13th; Lansing, Michigan, 12th, 20th; Manitowoc, Wisconsin, 14th; Swartz Creek, Michigan, 15th; Northport, Michigan, 15th; Chicago, Illinois, 16th; Milwaukee, Wisconsin, 18th; Marquette, Michigan, 20th.

Extreme northwest.—Bismarck, Dakota, 15th.

Upper Mississippi valley.—Anna, Illinois, 10th; Cairo, Illinois, 10th, 11th; Dubuque, Iowa, 13th, 14th, 15th; Davenport, Iowa, 14th; Madison, Wisconsin, 14th; Keokuk, Iowa, 15th; Saint Louis, Missouri, 13th, 24th.

Missouri valley.—Fort Scott, Kansas, 15th; De Soto, Nebraska, 15th.

Middle slope.—Dodge City, Kansas, 12th; Fort Supply, Indian Territory, 17th.

Southern slope.—Fort Concho, Texas, 14th; Fort Stockton, Texas, 15th, 18th, 19th, 20th, 21st.

Northern plateau.—Lewiston, Idaho, 14th.

MIRAGE.

Northport, Michigan.—From 3 to 4:30 p. m., of the 23d, a forest twelve miles northeast of this place appeared to be about one hundred feet above the horizon.

Mirage was also observed at Indianola, Texas, on the 2d, 18th, 20th, and 28th.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Sun spots were observed by Mr. William Dawson at Spice-land, Indiana, as follows:

1st.—Three groups; one hundred spots; two large spots close together near the centre of the sun were easily seen without telescope.

3d.—Four groups; seventy spots; the large spots still seen without telescope.

5th.—Two groups; forty spots; same number of groups and spots were also seen on the 7th and 9th, but on the latter date one large group had disappeared by rotation and a new and very prominent group appeared at the edge of the sun.

13th.—Seven groups; sixty spots; mostly in the eastern hemisphere, power 50 (generally use power of 100).

16th.—Eight groups; ninety spots; large group near the east edge.

17th.—Eight groups; one hundred and ten (?) spots; some cloud; a nearly straight row of groups extends across the sun's disc.

19th.—Ten groups; one hundred and sixty-five spots; very large group slightly east of the centre.

21st.—Seven groups; one hundred and eighty-five spots; one group of fifty spots near the east edge, and another group southwest of the centre with nearly as many spots.

24th.—Eight groups; two hundred and thirty spots (largest number observed for about eight years); one group in southeast quadrant had one hundred and thirty spots; three or four of them near together in one penumbra about 50,000 miles

diameter, and plainly visible to the unassisted eye. This would seem to be the current maximum, although it was thought to have occurred in April, 1882.

25th.—The large spot has changed considerably.

27th.—Six groups; one hundred and ten (?) spots.

28th.—Six groups; fifty-six spots. The great penumbra and spots were much broken on this date, although they were plainly seen with a shade glass only.

29th.—Three groups; thirty-five spots. The large spot was near the west edge, and scarcely visible to the naked eye.

31st.—Five groups; fifty-two spots. On this date the large group had disappeared by rotation and a new group of twenty-four spots appeared in the southeast quadrant.

Roseburg, Oregon.—A small black spot was visible on the sun's disc on the 29th. It was still visible on the 30th, but had diminished in size.

Fort Wayne, Indiana.—Sun spots were seen at this place on the 1st, with the unassisted eye.

Carson City, Nevada.—Two large spots were observed near the centre of the sun's disc at noon of the 1st.

The s. s. "Donau," near N. 43° 14', W. 57° 39', on the 27th, saw a dark spot near the centre of the sun; it moved westward, and on the 28th was seen near the west edge of the sun.

The s. s. "Llandaff City," from New York to Bristol, observed, on the 17th, a very large spot on the sun; it was also seen on several days afterwards, altering its position each day.

Albany, Oregon, 31st.—The smoky state of the atmosphere, caused by the continued forest fires, afforded favorable opportunity for observing the sun spots with the naked eye. The spots were very distinct, as much so as the recent "transit of Venus," which they very much resembled.

The following record of sun spots for the month of July 1883, has been forwarded by Professor D. P. Todd, Director of the Lawrence Observatory, Amherst, Massachusetts:

Date— July, 1883.	No. of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 7 a. m.	0	0	1	5	0	0	3	40†	Two of spots quite large.
1, 4 p. m.	0	0	0	0	0	0	3	40†	
2, 7 a. m.	0	0	0	5	0	0	3	35†	Spots probably disappeared by solar rotation.
3, 7 a. m.	1	10†	0	0	1	5	4	45†	
5, 7 a. m.	0	5	2	20†	0	5	2	30†	
6, 8 a. m.	0	10	0	10	0	10	2	30†	Many of the spots small. Do. Do. Do. Do. Do. Do.
6, 6 p. m.	0	5	0	5	0	5	2	30†	
7, 7 a. m.	0	5	0	3	0	0	2	30†	
8, 6 a. m.	0	0	1	7	0	0	1	23	
9, 6 p. m.	1	5	0	3	1	5	2	25†	
10, 8 a. m.	1	5	0	0	0	0	3	30†	
10, 5 p. m.	1	10†	0	0	1	6	4	40†	
11, 7 a. m.	0	10	0	0	0	0	4	50†	
12, 8 a. m.	2	20†	0	5	1	2	6	65†	
13, 7 p. m.	0	0	0	15†	0	0	6	50†	
14, 12 m.	0	0	0	5	0	0	6	35†	Also many veiled spots and broad areas of faculae. Broad areas of faculae. Faculae quite numerous.
16, 2 p. m.	2	15†	1	5	2	15†	7	45†	
17, 3 p. m.	2	10†	0	0	1	7	9	55†	
18, 9 a. m.	0	10†	1	2	0	10†	7	60†	
19, 10 a. m.	2	15†	0	0	1	5	9	75†	
20, 10 a. m.	1	15†	2	5	1	3	8	85†	
21, 9 a. m.	0	0	1	5	0	0	7	80†	
22, 1 p. m.	1	2	0	5	1	2	8	75†	
23, 6 p. m.	0	0	0	5	0	0	8	70†	
24, 9 a. m.	0	0	1	2	0	0	6	60†	
25, 4 p. m.	0	0	0	0	0	0	6	60†	Faculae were seen at the time of every observation. †Approximated.
26, 6 a. m.	0	0	0	0	0	0	6	60†	
26, 6 p. m.	0	0	0	5	0	0	6	55†	
27, 7 a. m.	0	0	0	10†	0	0	5	40†	
28, 6 a. m.	0	10†	1	5	0	0	4	45†	
29, 8 a. m.	0	0	1	5	0	0	3	40†	
29, 4 p. m.	1	5	0	0	0	0	4	45†	
30, 7 a. m.	1	10†	0	5	0	0	5	50†	
31, 8 a. m.	0	15†	0	10†	0	0	5	55†	

Faculae were seen at the time of every observation. †Approximated.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal-Service stations. Reports from one hundred and forty-four stations show 4,382 observations to have been made, of which eight were reported doubtful; of the remainder, 4,374, there were 3,607, or 82.2 per cent., followed by the expected weather.